

Amendments to the Claims

This listing of claims will replace all prior version and listings of claims in the application:

Listing of Claims:

1. (Currently amended): An optical object investigation device, comprising a microscope having an object area[[(64)], in which an object[[(72)] to be investigated ~~may~~ is to be placed, an observation beam path[[(62)], which leads from the object area to an image area[[(66)], and at least one illumination beam path ~~(80, 82, 100)~~ connected to a light input ~~(84, 86, 102)~~, ~~by means of which illumination beam path for illuminating the object area may be illuminated~~, and ~~comprising an illuminator~~[[(10)] having a light source[[(12)], [[which]] wherein the illuminator is connected or may be connected connectable to the light input with a light output ~~(34 or 34-1 or 34-2)~~,

characterised in that

the illuminator comprises optical components ~~(16-1, 18-1, 20-1, 16-2, 18-2, 20-2)~~, which define a plurality of light paths ~~(14-1, 14-2; 14-1, 14-2, 14-3)~~ originating from the light source;

in at least one of the plurality of light paths ~~there is arranged~~ a light conditioning arrangement ~~(22-1 or 22-2 or 22-3 respectively)~~ is provided, in order to supply the microscope with conditioned light via the light output;

the illuminator comprises at least one light path selector unit ~~(24; 24, 25)~~, which comprises a plurality of input light path portions assigned in each case to a different one of the plurality of light paths and at least one output light path portion leading to the light output or to an assigned one of a plurality of light outputs of the illuminator;

a control unit controlling the light path selector unit is provided, ~~by means of which~~
whereby the light path selector unit ~~[[may]] is selectively adjustable~~ ~~be adjusted~~ between
a plurality of selector states in such a way that, when the light path selector unit is in an
appropriate selector state, each of the plurality of light paths ~~[[may]] is selectively~~ ~~[[be]]~~
connected as a selected light path via the output light path portion to the light output or
via a predetermined or selected output light path portion to a predetermined or selected
light output, in order to supply the microscope with light or conditioned light from the
selected light path;

the control unit is designed to adjust the light path selector unit ~~(24; 24, 25)~~ in a selected
time sequence in accordance with a predeterminable selection program in a defined
manner between its selector states and to provide defined adjustment times for adjusting
the light path selector unit between its selector states; and

the light path selector unit ~~[[(24)]]~~ comprises at least one optical light deflector element
~~[[(26)]]~~ adjustable between a plurality of selection positions, wherein each selector state
~~[[may be]] is~~ achieved on the basis of at least one selection position of the at least one
optical light deflector element, light which is incident via the assigned selected light path
being diverted in the respective selector state into the output light path portion or into the
predetermined or selected output light path portion and light which is incident via ~~[[the~~
~~or]]~~ a respective non-selected light path not being diverted into ~~[[the or into]]~~ any output
light path portion.

2. (Currently amended): ~~[[An]]~~ The object investigation device according to claim 1,
characterised in that the light path selector unit ~~(24; 24, 25) may be adjusted into is~~
adjustable to be in at least one selector state in which no light path is selected, such that
none of the plurality of light paths is connected to ~~the or~~ a light output.

3. (Currently amended): ~~[[An]]~~The object investigation device according to claim 1~~[[or 2]]~~, characterised in that the ~~light path selector unit (24) comprises at least one mirror at least one optical light deflector element~~ [(26)] is arranged to be swivellable or rotatable by means of an actuator~~[[(28)]]~~.
4. (Currently amended): ~~[[An]]~~The object investigation device according to claim 3, characterised in that the actuator ~~[[takes]]~~ is formed in the form of a galvanometer~~[[(28)]]~~.
5. (Currently amended): ~~[[An]]~~The object investigation device according to claim any one of claims 1~~[[to 4]]~~, characterised in that the light path selector unit comprises at least one micromechanical adjusting mirror arrangement with a plurality of micromechanical adjusting mirrors, which ~~[[may be]]~~ is controllable ~~controlled~~ electrically in order to adjust the plurality of micromechanical adjusting mirrors or selected ones of the plurality of micromechanical adjusting mirrors between a plurality of selection positions.
6. (Currently amended): ~~[[An]]~~The object investigation device according to claim 5, characterised in that the plurality of micromechanical adjusting mirrors ~~[[take]]~~ are formed in the form of swivel mirrors.
7. (Currently amended): ~~[[An]]~~The object investigation device according to claim any one of claims 1~~[[to 6]]~~, characterised in that the light conditioning arrangement~~(22-1, 22-2; 22-1, 22-2, 22-3)~~ comprises an optical wavelength selection arrangement, ~~by means of which whereby~~ at least one predetermined or settable selection wavelength, preferably precisely one predetermined or settable selection wavelength, ~~[[may be]]~~ is selected ~~[[with]]~~ within a predetermined or settable selection bandwidth for propagation in the direction of the light path selector unit~~(24 or 25)~~.

8. (Currently amended): ~~[[An]]~~The object investigation device according to claim 7, characterised in that in each of the plurality of light paths ~~(14-1, 14-2; 14-1, 14-2, 14-3)~~ ~~there is provided a~~ the light conditioning arrangement ~~(22-1, 22-2; 22-1, 22-2, 22-3)~~ ~~comprising~~ comprises a respective wavelength selection arrangement, ~~by means of which~~ whereby light conditioning arrangement selection wavelengths differing with regard to the light path ~~[[may be]]~~ are selected for propagation in the direction of the light path selector unit.
9. (Currently amended): ~~[[An]]~~The object investigation device according to claim ~~any one of claims 1~~ ~~[[to 8]]~~, characterised in that the light conditioning arrangement comprises an optical polariser arrangement.
10. (Currently amended): ~~[[An]]~~The object investigation device according to claim ~~any one of claims 1~~ ~~[[to 9]]~~, characterised in that the light conditioning arrangement comprises an adjustable optical intensity attenuating arrangement or beam shading arrangement~~[[(50)]]~~ for setting an output intensity at the light output.
11. (Currently amended): ~~[[An]]~~The object investigation device according to claim ~~any one of claims 1~~ ~~[[to 10]]~~, characterised by at least one light trap~~[[(36)]]~~ assigned to the light path selector unit, ~~to which~~ wherein the at least one light trap is connected to a non-selected light path ~~[[may be connected]]~~ via the light path selector unit, and/or by an optical shutter arrangement in at least one of the plurality of light paths or light path portions.
12. (Currently amended): ~~[[An]]~~The object investigation device according to claim ~~any one of claims 1~~ ~~[[to 11]]~~, characterised in that ~~[[precisely]]~~ one light output~~[[(34)]]~~ is provided, wherein the one light output is preferably connected to ~~[[which precisely]]~~ one selected ~~[[one]]~~ light path of the plurality of light paths ~~may preferably be connected by~~ means of the light path selector unit.

13. (Currently amended): ~~[[An]]~~The object investigation device according to claim ~~any one of claims 1~~ ~~[[to 11]]~~, characterised in that at least two light outputs ~~(34-1, 34-2)~~ are provided, and ~~[[in that]]~~ at least two selected light paths ~~[[may be]]~~ are simultaneously connected to ~~a respective one of the~~ at least two light outputs by means of the light path selector unit or by means of at least two ~~separate~~ light path selector units ~~(24, 25)~~.
14. (Currently amended): ~~[[An]]~~The object investigation device according to claim ~~any one of claims~~ ~~[[1 to]]~~13, characterised in that the at least two light path selector units ~~(24, 25)~~ ~~[[may be]]~~ are adjusted into mutually assigned selector states, in such a way that a selected ~~[[one]]~~ light path of the plurality of light paths is connected via these light path selector units to the light output or a predetermined or selected light output.
15. (Currently amended): ~~[[An]]~~The object investigation device according to claim ~~any one of claims 1~~ ~~[[to 14]]~~, characterised in that more than two light paths ~~(14-1, 14-2, 14-2)~~ are provided.
16. (Currently amended): ~~[[An]]~~The object investigation device according to claim ~~any one of claims 1~~ ~~[[to 15]]~~, characterised in that reflective components ~~(18-1, 20-1, 18-2, 20-2)~~ and/or refractive components ~~(16-1, 16-2)~~ and/or diffractive components are provided as the optical components defining the plurality of light paths.
17. (Currently amended): ~~[[An]]~~The object investigation device according to claim ~~any one of claims 1~~ ~~[[to 16]]~~, characterised in that mirrors ~~(18-1, 20-1, 18-2, 20-2)~~ and/or lenses ~~(16-1, 16-2)~~ and/or diaphragms are provided as the optical components defining the plurality of light paths.

18. (Currently amended): ~~[[An]]~~The object investigation device according to claim any one of claims 1~~[[to 17]]~~, characterised in that the plurality of light paths ~~[[take]]~~ is formed in the form, at least between the light source and the light path selector unit, of free radiation light paths ~~(14-1, 14-2; 14-1, 14-2, 14-3)~~ which are not bound to a medium which defines the light path.
19. (Currently amended): ~~[[An]]~~The object investigation device according to claim any one of claims 1~~[[to 18]]~~, characterised in that the light output or the plurality of light outputs are formed on the basis of a ~~[[(respective)]]~~ light guide ~~(34; 34-1, 34-2)~~.
20. (Currently amended): ~~[[An]]~~The object investigation device according to claim any one of claims 1~~[[to 19]]~~, characterised in that the control unit controls ~~[[controls]]~~ the light conditioning arrangement or light conditioning arrangements.
21. (Currently amended): ~~[[An]]~~The object investigation device according to claim any one of claims 1~~[[to 20]]~~, characterised in that ~~[[it]]~~ the object investigation device further comprises at least one incident-light illumination beam path, preferably at least two incident-light illumination beam paths ~~(80, 82)~~, which optionally coincide(s) at least in part with the observation beam path~~[[(62)]]~~.
22. (Currently amended): ~~[[An]]~~The object investigation device according to claim any one of claims 1~~[[to 21]]~~, characterised in that ~~[[it]]~~ the object investigation device further comprises at least one transmitted-light illumination beam path~~[[(100)]]~~.
23. (Currently amended): ~~[[An]]~~The object investigation device according to claim any one of claims 1~~[[to 22]]~~, characterised in that ~~[[it]]~~ the object investigation device further comprises at least two, preferably at least three illumination beam paths ~~(80, 82, 100)~~, which ~~[[may be]]~~ are supplied alternately or ~~[[-]]~~ preferably ~~[[-]]~~ simultaneously with illumination light from the illuminator~~[[(10)]]~~.

24. (Currently amended): ~~[[An]]~~The object investigation device according to claim ~~any one of claims 1~~ ~~[[to 23]]~~, characterised in that ~~[[it]]~~ the object investigation device further comprises a fluorescence measuring device~~[[(60)]]~~ comprising the object area~~[[(64)]]~~, the observation beam path~~[[(62)]]~~ and the at least one illumination beam path~~(80, 82, 100)~~ and including the microscope.
25. (Currently amended): An illuminator for an optical object investigation device, which comprises a microscope having an object area~~[[(64)]]~~, in which an object~~[[(72)]]~~ to be investigated ~~may is to be~~ placed, an observation beam path~~[[(62)]]~~, which leads from the object area to an image area~~[[(66)]]~~, and at least one illumination beam path~~(80, 82, 100)~~ connected to a light input~~(84, 86, 102)~~, ~~by means of which illumination beam path for illuminating the object area may be illuminated, in particular for an optical object investigation device according to claim 1,~~ comprising:
- ~~[[-]]~~ a light source~~(12)~~;
- ~~[[-]]~~ a plurality of optical components~~(16-1, 18-1, 20-1, 16-2, 18-2, 20-2)~~, which define a plurality of light paths~~(14-1, 14-2; 14-1, 14-2, 14-3)~~ originating from the light source;
- ~~[[-]]~~ a light conditioning arrangement~~(22-1 or 22-2 or 22-3 respectively)~~ in at least one of the plurality of light paths,
- ~~[[-]]~~ at least one light output~~(34; 34-1, 34-2)~~, to which the microscope~~(40; 60)~~ to be supplied with light or conditioned light is connectable ~~connected or may be connected~~;

[[-]] at least one light path selector unit ~~(24; 24, 25)~~, which comprises a plurality of input light path portions assigned in each case to a different one of the plurality of light paths and at least one output light path portion leading to ~~[[the]]~~ a light output or to an assigned one of the at least one light output[[s]]; and

[[-]] a control unit controlling the at least one light path selector unit whereby the light path selector unit ~~[[may]] is selectively adjustable~~ ~~be adjusted~~ between a plurality of selector states in such a way that, when the light path selector unit is in an appropriate selector state, each of the plurality of light paths ~~[[may]] is selectively~~ ~~[[be]] selected~~ a light path via the output light path portion to the light output or via a predetermined or selected output light path portion to a predetermined or selected light output, in order to supply the microscope with light or conditioned light from the selected light path,

wherein the control unit is designed to adjust the light path selector unit ~~(24; 24, 25)~~ in a selected time sequence in accordance with a predeterminable selection program in a defined manner between its selector states and to provide defined adjustment times for adjusting the light path selector unit between its selector states; and

wherein the light path selector unit ~~[[(24)]]~~ comprises at least one optical light deflector element ~~[[(26)]]~~ adjustable between a plurality of selection positions, wherein each selector state ~~[[may be]] is~~ achieved on the basis of at least one selection position of the at least one optical light deflector element, light which is incident via the assigned selected light path being diverted in the respective selector state into the output light path portion or into the predetermined or selected output light path portion and light which is incident via the or a respective non-selected light path not being diverted into the or into any output light path portion.

26. (Currently amended): ~~[[An]]The~~ illuminator according to claim 25, characterised in that the light path selector unit ~~(24; 24, 25)~~ ~~may be adjusted into~~ is adjustable to be in at least one selector state in which no light path is selected, such that none of the plurality of light paths is connected to ~~the or~~ a light output.
27. (Currently amended): ~~[[An]]The~~ illuminator according to claim 25~~[[or 26]]~~ characterised in that the ~~light path selector unit (24)~~ comprises at least one mirror at least one optical light deflector element ~~[[(26)]]~~ is arranged to be swivellable or rotatable by means of an actuator~~[[(28)]]~~.
28. (Currently amended): ~~[[An]]The~~ illuminator according to claim 27, characterised in that the actuator ~~[[takes]]~~ is formed in the form of a galvanometer (28).
29. (Currently amended): ~~[[An]]The~~ illuminator according to claim any one of claims 25~~[[to 28]]~~, characterised in that the light path selector unit comprises at least one micromechanical adjusting mirror arrangement with a plurality of micromechanical adjusting mirrors, which ~~[[may be]]~~ is controlled electrically in order to adjust the plurality of micromechanical adjusting mirrors or selected ones of the plurality of micromechanical adjusting mirrors between a plurality of selection positions.
30. (Currently amended): ~~[[An]]The~~ illuminator according to claim 29, characterised in that the plurality of micromechanical adjusting mirrors ~~[[take]]~~ are formed in the form of swivel mirrors.
31. (Currently amended): ~~[[An]]The~~ illuminator according to claim any one of claims 25~~[[to 30]]~~, characterised in that the light conditioning arrangement ~~(22-1, 22-2; 22-1, 22-2, 22-3)~~ comprises an optical wavelength selection arrangement, ~~by means of which~~ whereby at least one predetermined or settable selection wavelength, preferably precisely one

- predetermined or settable selection wavelength, ~~[[may be]]~~ is selected ~~[[with]]~~ within a predetermined or settable selection bandwidth for propagation in the direction of the light path selector unit ~~(24 or 25)~~.
32. (Currently amended): ~~[[An]]~~ The illuminator according to claim 31, characterised in that in each of the plurality of light paths (14-1, 14-2; 14-1, 14-2, 14-3) ~~there is provided a the~~ light conditioning arrangement ~~(22-1, 22-2; 22-1, 22-2, 22-3) comprising~~ comprises a respective wavelength selection arrangement, ~~by means of which~~ whereby light conditioning arrangement selection wavelengths differing with regard to the light path ~~[[may be]]~~ are selected for propagation in the direction of the light path selector unit..
33. (Currently amended): ~~[[An]]~~ The illuminator according to claim ~~any one of claims 25~~ ~~[[to 33]]~~, characterised in that the light conditioning arrangement comprises an optical polariser arrangement.
34. (Currently amended): ~~[[An]]~~ The illuminator according to claim ~~any one of claims 25~~ ~~[[to 33]]~~, characterised in that the light conditioning arrangement comprises an adjustable optical intensity attenuating arrangement or beam shading arrangement ~~[[(50)]]~~ for setting an output intensity at the light output.
35. (Currently amended): ~~[[An]]~~ The illuminator according to claim ~~any one of claims 25~~ ~~[[to 34]]~~, characterised by at least one light trap ~~[[(36)]]~~ assigned to the light path selector unit, ~~to which~~ wherein the at least one light trap is connectable to a non-selected light path ~~[[may be connected]]~~ via the light path selector unit, and/or by an optical shutter arrangement in at least one of the plurality of light paths or light path portions.
36. (Currently amended): ~~[[An]]~~ The illuminator according to claim ~~any one of claims 25~~ ~~[[to 35]]~~, characterised in that ~~[[precisely]]~~ one light output ~~[[(34)]]~~ is provided, wherein the one light output is preferably connected to ~~[[which precisely]]~~ one selected ~~[[one]]~~ light

path of the plurality of light paths ~~may preferably be connected~~ by means of the light path selector unit.

37. (Currently amended): ~~[[An]]The~~ illuminator according to claim ~~any one of claims 25~~ ~~[[to 35]]~~, characterised in that at least two light outputs ~~(34-1, 34-2)~~ are provided, and ~~[[in that]]~~ at least two selected light paths ~~[[may be]]~~ are simultaneously connected to a ~~respective one of the~~ at least two light outputs by means of the light path selector unit or by means of at least two ~~separate~~ light path selector units ~~(24, 25)~~.
38. (Currently amended): ~~[[An]]The~~ illuminator according to claim ~~any one of claims 25~~ ~~[[to 37]]~~, characterised in that the at least two light path selector units ~~(24, 25)~~ may be are adjusted into mutually assigned selector states, in such a way that a selected ~~[[one]]~~ light path of the plurality of light paths is connected via these light path selector units to the light output or a predetermined or selected light output.
39. (Currently amended): ~~[[An]]The~~ illuminator according to claim ~~any one of claims 25~~ ~~[[to 38]]~~, characterised in that more than two light paths ~~(14-1, 14-2, 14-2)~~ are provided.
40. (Currently amended): ~~[[An]]The~~ illuminator according to claim ~~any one of claims 25~~ ~~[[to 39]]~~, characterised in that reflective components ~~(18-1, 20-1, 18-2, 20-2)~~ and/or refractive components ~~(16-1, 16-2)~~ and/or diffractive components are provided as the optical components defining the plurality of light paths.
41. (Currently amended): ~~[[An]]The~~ illuminator according to claim ~~any one of claims 25~~ ~~[[to 40]]~~, characterised in that mirrors ~~(18-1, 20-1, 18-2, 20-2)~~ and/or lenses ~~(16-1, 16-2)~~ and/or diaphragms are provided as the optical components defining the plurality of light paths.
42. (Currently amended): ~~[[An]]The~~ illuminator according to claim ~~any one of claims 25~~ ~~[[to 41]]~~, characterised in that the light paths take the form, at least between the light source

and the light path selector unit, of free radiation light paths ~~(14-1, 14-2; 14-1, 14-2, 14-3)~~
which are not bound to a medium which defines the light path.

43. (Currently amended): ~~[[An]]The~~ illuminator according to claim ~~any one of claims 25~~ ~~[[to~~
42]], characterised in that the light output or the light outputs are formed on the basis of a
[[~~(C)~~]respective~~[[D)]~~] light guide ~~(34; 34-1, 34-2)~~.
44. (Currently amended): ~~[[An]]The~~ illuminator according to claim ~~any one of claims 25~~ ~~[[to~~
43]], characterised in that the control unit controls the light conditioning arrangement or
light conditioning arrangements.